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Review Article

FEEDING MANAGEMENT OF HIGH YIELDING COWS DURING TRANSITION PERIOD

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Abstract: The transition period is period between three weeks before and three weeks after calving, and is characterised by greatly increased risk of production disease. Failure to transition successfully can result in reduced DMintake, milk production, delayed oestrus, failure to conceive and increased incidence of metabolic and infectious diseases, many of which are inter-related. The hallmark of the transition period of dairy cattle is the dramatic change in nutrient demands that necessitate exquisite coordination of metabolism to meet requirements for energy, glucose, amino acid and Calcium by the mammary gland following calving. Despite the prodigious output of research on the nutrition and physiology of transition cows, transition Period remains a problematic area on many dairy farms and metabolic disorders continue to occur at economically important rates on commercial dairy farms. Nutritional management during this phase directly affects the incidence of post calving disorder, milk production and reproduction in the subsequent lactation. The transition period is very important as for as the nutrition of the pregnant animal is concern because a poor nutritional program during this period increases feed costs per unit of milk produced and decreases income through reduced milk production, decreased reproductive efficiency and increased incidences of metabolic disorders.

Keywords: Transition, dry matter, economical, nutrition, milk production.

Introduction

Transition period characterised by greatly increased risk of production disease. All metabolic processes are intricately linked. This concept reflects a need for effective homeostatic control of metabolism. A failure of one metabolic process will inevitably impact on the efficiency of others. The transition period remains a problematic area on many dairy farms and metabolic disorders continue to occur at economically important rates on commercial dairy farms. Nutritional management during this phase directly affects the incidence of post calving disorder, milk production and reproduction in the subsequent lactation. The transition period is very important as for as the nutrition of the pregnant animal is concern because a poor nutritional program during this period increases feed costs per unit of milk produced and

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decreases income through reduced milk production, decreased reproductive efficiency and increased incidences of metabolic disorders.

Metabolic status of transition cow

Metabolic adaptations necessary to support milk production are a component of the factors being genetically selected. The nutrient and energy deficits after parturition are met by mobilization of body reserves and by decreasing nonessential use of glucose in non-mammary tissues. Metabolic adaptations are mediated by an exquisite pattern of hormonal shifts and changes in tissue responsiveness to those hormones. Growth hormone (GH) is increased around parturition and in early lactation, which increases responsiveness of adipose tissue to lipolytic signals such as no repinephrine. The resulting increase of non-esterified fatty acids (NEFA) from adipose tissue are used as alternate fuels for much of the rest of the body, and are also converted to ketone bodies by the liver. The metabolic change during the transition period includes glucose metabolism, lipid metabolism, Calcium and Phosphorus metabolism, dry matter intake and immune system.

Transition cow diet

Energy

The balance between structural carbohydrates (fiber) and nonstructural carbohydrates (grains or concentrate by-product feeds) in diets fed before and after calving is probably one of the most important dietary factors for transition success. Adequate fiber of sufficient particle size is needed to maintain rumen function, prevent acidosis and achieve high dry matter intake (DMI). Sufficient non-fiber carbohydrates (sugars and starch provided by grains) must be present to provide adequate energy in the form of propionic acid for glucose synthesis and suppress synthesis of ketone bodies. Starch promotes ruminal production of propionate, which triggers insulin release and keeps regulating body fat mobilization. The energetic demands of gestating cows reach 1.3 to 1.5 times the maintenance requirements by the end of gestation. But during transition period cows are able to consume less then they required resulting in the negative energy balance and the concomitant loss of body weight .NEB is greatest in the first week postpartum.

Protein

Crude protein is a poor predictor of the amount of amino acids actually available for absorption. Availability of bacterial protein can influence milk production and reproductive benefits. Production of ruminal bacteria is stimulated by the presence of peptides in transition diet. In transition period primiparous cows require a higher dietary protein concentration at

14 to 16 % of total DM, than the multiparous cows at 12 % (NRC, 1989 specification) Methionine and lysine are often considered the first rate limiting amino acids for dairy cows (NRC 2002).The strongly positive methionine and lysine balance of the diets may also have had a sparing effect on choline which may be a limiting nutrient for milk production in high-yielding dairy cows.

Fat

Feeding of fat supplements during the pre and post-partum period has not traditionally been recommended due to the potential to reduce dry matter intakes, particularly in heifers. Protected fats, including calcium soaps and prills, may provide energy and they have less effect on feed intake and can provide specific fatty acids. Feeding 225 and 454 grams (1/2 to 1 lb) of fat per cow/day. Feeding of fat supplements during the pre and post-partum period has not traditionally been recommended due to the potential to reduce dry matter intakes, particularly in heifers.

Macro minerals

In pre-partum calcium should be given less than 0.6 % more Ca in pre-partum diet increases risk of milk fever. At parturition there is a sudden increase in the cow's calcium requirements for colostrum (2-3g Ca/L) and milk (1.22-1.45g Ca/L) the onset of lactation increases the cow's daily calcium requirement by 2-4 fold. If this blood calcium is not replaced rapidly cows will become hypocalcemic with some developing clinical milk fever. Recommended level of magnesium concentration in the diet is at least 0.45% before and after calving. On-pregnant, non-lactating cows fed a diet high in magnesium had lower renal calcium excretion than those fed a diet low in magnesium. Magnesium is critical in the release of parathyroid hormone and in the synthesis of 1, 25(OH) 2 D3.In cattle, pre-calving diet high in phosphorus have negative impact on calcium homeostasis.

Dietary cation anion difference (DCAD)

$DCAD = (Na^{+} + k^{+}) - (Cl^{-} + S^{2-})$ *mEq/kg DM.*

The recommended target DCAD is -10 to -15 meq/100g dietary DM in prepartum and 22 to 44 meq/100g DM in postpartum to achieve the desired changes in acid-base status and subsequent increases in blood Calcium.

Micro minerals

Chromium supplementation during the pre-calving period may reduce insulin resistance and subsequently decrease plasma NEFA, liver triglyceride levels and improve glucose tolerance, which may result in improved productivity in the post-calving period

Rumen modifiers

Rumen modifiers act directly on rumen microbes, altering the balance between the different microbial populations and the proportions of the volatile fatty acids (VFAs) they produce. Ionophore rumen modifiers include sodium monensin and lasalocid. Antibiotic rumen modifiers include virginiamycin and tylosin. Sodium monensin primarily increases ruminal propionate balance. Virginiamycin, Tylosin reduces lactic acid production. If a rumen modifier is used in the lactation diet, the same rumen modifier should be used in the transition diet pre-calving. Though controlling the risk of acidosis is critical, buffering using sodium bicarbonate is contraindicated because of the very high DCAD of the buffer. But buffers including sodium bicarbonate are suitable to be fed after calving. Instead we can use magnesium oxide to which act as a neutralising agent and also supply magnesium. Low DCAD buffering agents can be used

Nutrient requirement of transition cow (NRC-1989)

Nutrient	Far off dry cow	Close up dry cow	Early lactation
DMI(lb/day)	28	22-24	38-40
NE(Mcal/lb)	0.58	0.68	0.75
Crudeprotein(%)	13	15	20
NFC (%)	25	23	38
DCAD(meq/kg)	NA	<0	>2

Conclusion

The transition period is Critical period for health, production and reproduction in dairy herd. Nutrition and management programs during this phase directly affect the incidence post calving disorder, Formulating transition diet three major areas of concern that needed healthy liver, rumen adaptation and mineral metabolism. Antioxidants and trace minerals have important roles immune production. Correct and balanced feeding and managemental practices during the transition period has a reflective effect on DMI. DMI is a major factor influencing both milk yield and body weight change in early lactation. Maximizing feed intake at all stages, but particularly during the transition period will optimize production and reproduction. These changes normally are exquisitely coordinated by hormonal changes to support the new physiological state of lactation, the concept known as homeostasis. However, these adaptive processes fail or are overcome by environmental influences in too many cows, resulting in periparturient illness. Research to continue to increase understanding of the

adaptive processes and how they are affected by precalving nutrition and environmental influences will undoubtedly improve our management capabilities for cows during the transition period.

Reference

[1] Beever, D.E. 2006. The impact of controlled nutrition during the dry period on dairy cow health, fertility and performance. *Anim. reprod. sci*. ***96***:212-226.

[2] Bell, A.W. 1995. Regulation of organic nutrient metabolism during transition fromlate pregnancy to early lactation. *J. Anim Sci*. **73**:2804-2819.

[3] Bhikane, A.U. and Syed, A.M., 2014. Recent trends in management of metabolic disorders of transition cows and buffaloes. *Intas Polivet*.***15***:485-497.

[4] Janovick, N.A. and Drackley, J.K. 2010. Prepartum dietary management of energy intake affects postpartum intake and lactation performance by primiparous and multiparous Holstein cows. *J. Dairy Sci.* ***93***:3086-3102.

[5] Patel, V.R., Kansara, J.D., Patel, B.B., Patel, P.B. and Patel, S.B. 2011. Prevention of Milk fever: Nutritional Approach. *Vet. Wld*.**4**:278-280.

[6] Overton, T.R. and Piepenbrink, M.S. 2001. Managing metabolism of transition dairy cows through nutrition. In *Proceedings of the Pacific Northwest Animal Nutrition Conference*. pp. 171-188.